

ISSD NEWSLETTER

Volume II Number 2

March 1989

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Dendrobatid Tadpoles Feed on Mosquito Larvae

by J.K. Frenkel, M.D.

While searching for tadpoles of *Dendrobates auratus* and *D. pumilio* in Costa Rica and Panama, mosquito larvae were frequently encountered. The search involved accumulations of water in bromelias, Aracea, Musacea and bamboo, so-called phytotelmata (1), as well as discarded styrofoam containers, metal cans and old tires. It seemed notable that mosquito larvae were not found together with *D. auratus* tadpoles; however, two mosquito larvae were found in a coconut shell with a tadpole of *D. pumilio*, which is known to feed only on food eggs (2).

To test whether Dendrobatid tadpoles eat mosquito larvae, laboratory-reared larvae of *Culex pipiens* were added to test tubes containing tadpoles of *D. auratus*. The mosquito larvae were readily eaten by intermediate and large tadpoles, often several daily. *Aedes* sp. larvae collected from a bucket in Kansas were eaten by tadpoles of *D. quinquevittatus*.

A great variety of aquatic organisms have been described from tank bromelias growing epiphytically on

trees. Frank (1) mentions 470 aquatic organisms, including 214 species of larval mosquitos. He divides tank bromelias into two types. Those with dendrophilous nutrition, that utilize materials falling from tree canopies, have a detritus-based food chain. Those with anemophilous nutrition, collecting wind-blown nutrients, appear to have an algae based food chain. Because these bromelias absorb most of the soluble nutrients from water held in leaf axils, phytotelmata are poor in available nutrients. Dendrobatid tadpoles fed with fish food, in phytotelmata, tend to develop more slowly than in jars with java moss and algae. *D. auratus* tadpoles fed with Tetramin (Tetra Werke, Melle, West Germany) and algae, metamorphosed and climbed up the sides of the jar after four to five weeks, whereas tadpoles that lived in an undetermined species of bromelia, climbed out in five to six weeks.

It is conceivable that mosquito larvae could constitute a useful, optional food source for Dendrobatid tadpoles. Experiments to compare tadpole growth in bromelias with and without mosquito larvae are planned as soon as a constant

supply of mosquito larvae can be secured.

The relative poverty of available food in bromelia phytotelmata may have selectively favored development of facultative food egg production, as with *D. quinquevittatus* (3), leading to obligatory food egg dependence by *D. pumilio* (2) and *D. histrionicus* (4). Brood care and food egg production are generally discussed in evolutionary and behavioral terms (5,6). However, the selective advantage that this seemingly costly habit provides, reproductive success in a nutritionally poor environment, must also be emphasized.

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"The Breeders Forum"

Here are three questions for the members from Anna Lejfelt-Sahlen of Uppsala, Sweden:

- 1) According to the literature, the natural foods for my *Dendrobates histrionicus* are ants and mites. Which species of ants can safely be used as food and which are harmful to the frogs? Is it safe to give them mites or can some kinds of mites attack the frogs (as is sometimes the case with

lizards)?

2) Most authors say that neither the quality, nor the quantity of light is very critical to Dendrobatids. Having had lots of troubles with my *Hyla meridionalis* group, (troubles that I can only account for by the fact that they had been kept for three years without direct sunlight or artificial UV-light) I am painfully aware of how important light can be! My *D. histrionicus* have a 18W Osram Tageslicht 5000 d l and a 18W Luma Gro-lux florescent tube as general light sources. I also use a Phillips TKL 09N 40W UV-tube for one hour each day. Can I feel confident that this is enough?

3) How much and how often should Dendrobatids be fed? I have gotten the impression that they should be fed a practically unlimited amount of food. To tell the truth, that seems to make them quite fat, so I have reduced it a bit. Should the food be powdered with vitamins every time? What is the ideal composition of the vitamin/mineral additive.

Jack Frenkel recently spoke to me of his observation that tadpoles placed in the cups of *Aechmea fasciata* die within a few hours. He postulates that there may be some toxin in the

plant that is responsible for this. Jack is interested in further investigation of this phenomenon and asks: has anyone noticed a recurrent pattern of tadpole deaths in certain species of plants?

We encourage anyone who has comments on these subjects or wishes to answer the above inquiries to send their reply to the newsletter editor. These will be published in subsequent editions for the benefit of all.

The Frogs Praise God

After the maggid's death, his disciples came together and talked about the things he had done. When it was Rabbi Schneur Zalman's turn, he asked them: "Do you know why our master went to the pond every day at dawn and stayed there for a while before coming home again?" They did not know why. Rabbi Zalman continued: "He was learning the song with which the frogs praise God. It takes a very long time to learn that song."

-Martin Buber, *Tales of the Hasidim*,
Early Masters

PACKING AND SHIPPING METHODS FOR DART-POISON FROGS

by: Andrew Briskin
Tropical Fish Pond of Miami
Miami, Florida

I have been asked many times how I ship Dendrobatids successfully. I think that it is time to let everyone in on some easy methods for shipment of these animals that prevent stress, and the attendant losses. Stress is the major killer of dart-frogs in captivity, and they stress quite easily. I do not have much control over the methods that are used for frogs shipped to me, but I am diligent in my efforts to assure that frogs shipped out by me are packed and shipped as well as they can be.

Each frog needs to be packed individually in a container large enough to prevent rubbing of the nose yet compact enough to limit movement, thus preventing skin damage. The best containers for this are the clear plastic cups commonly used for shipping the Bettas of South East Asia. They are available from cup manufacturers in bulk, or at any local fish wholesale outlet. One should not use these cups with large species such as *D. tinctorius* because the frogs will

be too cramped and will, as a result, stress out. Plastic deli cups should be used for these larger species. Paper toweling in the container will prevent the frogs from being tossed about inside the cups. The toweling should be placed loosely in the cups so that the frogs can bury into the material; it should be dampened with tap water and then wrung out to prevent water from leaking all over. Although you do not want leaking water to damage the shipping box, adequate moisture is an absolute necessity for the frogs! Balance must be achieved between these two conflicting needs.

The cups should be ventilated with several air holes. This is an important step in the packing process; here a very simple idea can result in the elimination of a significant problem. Using a hole punch to make the air vents causes rough edges. If there is but one rough edge on the cup, you can be sure the frog will scratch its nose on it. One of our

members, Ann Jesup, suggested to me that I use a nail to make the air vents, pushing the hole through the plastic from the inside of the cup towards the outside. The rough edges are thus on the outside where the frogs cannot scratch their skin on them. Skin abrasions acquired during shipping often become infected and these are very difficult to treat successfully. The usual outcome is death of the animal, often several weeks after shipping. The air holes should be made in the sides of the cup rather than the top, as the cups are usually stacked and side ventilation is less constricted.

The type of box used for shipping is very important. It must be lined with insulating foam to prevent extreme fluctuations of temperature from reaching the frogs. When plane changes are made for flight connections, freight is often left standing on the tarmac if the connection time is "short". What is considered a "short" time by the airline's freight attendant can be a disastrously long time for a delicate little amphibian confined to a box standing in the hot sun on a blacktop tarmac. Styrofoam not only keeps out summer's heat, but winter's cold as well. The thicker the styrofoam, the better. The box must

be insulated on its bottom, top, and all sides. No air holes are needed in the box or foam, as there is a slow exchange of air through the box seams. In cold weather, heat packs may be used. These are manufactured so that two chemicals are contained in small bags, one inside the other. Squeezing the outer bag results in rupture of the inner one. When the two chemicals mix there is a slow exothermic (heat releasing) chemical reaction. Once activated, these should be wrapped in newspaper to delay heat loss within the box. The cups containing the frogs are placed within the box in rows (care being taken to prevent contact with the heat pack) and separated with newspaper. Loosely crumpled newspaper is used as a filler to prevent movement of the cups during shipment. The box should then be sealed with strong packing tape, care being taken to check all seams, especially the bottom, for weakness. This is very important because you never know what might happen to the box during the shipment.

The box must be labeled in accordance with U.S. Fish and Wildlife regulations, which require the following:

- The Scientific name of

the species contained.

- The quantity of each species contained
- Directional **UP** arrows on the box's sides

These regulations were written to help prevent undue harm to animals during shipping. They are required by international wildlife treaties and by the Lacey act. Please be sure to label the boxes properly!

I ship by two methods; U.S. Postal Service Express Mail and commercial air freight. I have had good success using both methods. Out of thousands sent, I have had only one Express Mail package lost. I have experienced occasional delays in air freight shipments. As the Postal Service does not guarantee perishables, air freight is the only method for insuring the animals, and even the airlines occasionally request perishable disclaimers.

If the above method is followed, good success in shipping these animals will be realized. Once you have received frogs shipped by these methods you will see the difference in quality and health.

My Aunt Maria asked me to read the life of Dr. Chalmers, which, however, I did not promise to do. Yesterday, Sunday, she was heard through the partition shouting to my Aunt Jane, who is deaf. "Think of it! He stood half an hour today to hear the frogs croak, and he wouldn't read the life of Chalmers."

-Henry David Thoreau



As it was taught: If there is dough in a house wherein reptiles and frogs breed, and pieces are found in the dough: if they are mostly reptiles, it is unclean; if mostly frogs it is clean.

Kiddushin, The Babylonian Talmud



Well, I woke up in the morning
There's frogs inside my socks

- Bob Dylan, On the Road Again

13th International Herpetological Symposium Set for Phoenix

The 13th International Herpetological Symposium on Captive Propagation and Husbandry will take place this year from June 20th to June 24th, at the Holiday Inn Airport East, in Phoenix, Arizona. **ISSD** will hold its second annual meeting in conjunction with the **IHS**. All **ISSD** members are welcome at the meeting and are encouraged to attend the **IHS**.

The registration fee this year will be \$125.00 if paid in full by May 15th, and \$150.00 thereafter. This fee entitles the attendee to admission to all paper and workshop sessions, the icebreaker, hospitality room, all scheduled meals, all scheduled side-trips, and a copy of the Symposium Proceedings. The room rate for **IHS** participants at the Holiday Inn Airport East will be \$39.00 per night for either a single or double room.

The schedule of events is as follows (tentative as of this writing):

Tuesday, June 20th	Registration	9:00 - 16:00
	Workshops	12:00 - 16:00
	Icebreaker	18:00 - 20:00
Wednesday, June 21st	Registration	8:00 - 21:00
	Trip to Arizona-Sonoran Desert Museum	9:00 - 15:00
	Tour Reid Park Zoo	15:30 - 17:00
	Mexican Buffet	17:00 - 19:00
	Dinner at the Zoo	
Thursday, June 22nd	Registration	8:00 - 21:00
	Papers	9:00 - 11:30
	Papers	13:00 - 16:00
	Tour World Wildlife Zoo	16:00 - 17:30
	Rawhide Cookout	18:30 - 21:00
Friday, June 23rd	Registration	8:00 - 21:00
	Papers	9:00 - 11:30
	Papers	13:00 - 16:00

Friday -	Tour of Boyce	16:30 - 17:30
	Thompson Arboretum	
	Cowboy Cookout at the Arboretum	18:00 - 20:00
Saturday, June 24th	Papers	9:00 - 11:30
	Workshops	13:00 - ?
	Adjournment	??????

A list of speakers will be published in the next newsletter. Dr. Bertram will be hosting a workshop on "General Principles of Construction of Tropical Terrariums." Although it has yet to be finally confirmed, we are anticipating that Eric Wevers will be presenting a paper on the "Captive Maintenance and Breeding of *Dendrobates azureus*." If Eric is unable to attend personally, the paper will be presented in his absence by Dr. Bertram.

The time of the **ISSD** meeting has not yet been set. It will be held sometime during the first three days of the symposium. More detailed information about the **ISSD** meeting will appear in the next newsletter. Registration forms for the **IHS** will be published in the next newsletter. We are sorry that we do not have these registration forms for this publication but they are not available. You will not be receiving the forms in time for the May 15th deadline. Therefore, if you need information sooner than that, write or call: Brian P. Backner, M.D., President of the **IHS**. Dr Backner's address and telephone number is as follows: 17 Margaret Road, Sharon, MA 02067; (617) 784-7264

On the isle of Wintermoth, this was on the fourth moon, the Baynards lived. They were like unto frogs as we know them and they had a most unusual occupation. They had a colony of men that they had captured during a journey to Earth. These were very valuable and they sold them to the Drudens who thought them to be great novelties because of their many colors. But the Baynards were poor stewards of their charges. First they bred them all together and the different races were lost. After this the Drudens were not willing to pay such a high price for them and thus a profitable industry declined. Because of this the Baynards began to regard the men with contempt and treated them badly. After a few generations they all died out and a great source of revenue was squandered.

From: *Tales of the Drudens* - Winslow

"How I got my pictus"

(Dale & Gail's Excellent Adventure)

by: Dale Bertram, M.D.

I am sure that you all are familiar with the thrill experienced in the acquisition of a new species for your collection. I must confess that I have never given much thought to the process whereby some new specimen became available to me. Last year Jack Frenkle gave me a fantastically beautiful specimen of *Dendrobates histrionicus* that he personally collected during one of his expeditions to Colombia. At the time I thought to myself that there were probably some interesting adventures involved in Jack's trips to Colombia. With this in mind I have decided to tell the story of "how I got my pictus".

In November of 1987 my wife, Gail, myself and our two daughters set out on a seven week trip to Amazonian Brazil. This was not a frog collecting trip; we had arranged to spend some time with a medical missionary at his remote jungle hospital in Santo Antonio do Ica, Brazil. However, I must confess that the thought had occurred to me that perhaps some interesting frogs might make the return trip with us.

We flew from Chicago to Miami and there made a connection to a Verig Airlines' flight to Manaus. We had never been to South America before, and there was a great sense of anticipation. The flight was at night, so we could not even tell when we passed over the coast and set out over the jungle towards Manaus. That first night I felt a nervous excitement just knowing that below me lay the awesome expanse of the Amazon jungle, the Matoo Grande as the Brazilians call it. More than a few times my thoughts turned to the small styrofoam box that I knew was packed with my stuff. That box was full of medicines now but hopefully it would carry another cargo on the return trip.

When we stepped off the plane in Manaus there was an immediate awareness that we were in a place very different from any we had ever seen before. The air was heavy and damp, almost steamy and it had a sweet smelling

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mustiness to it. It was deliciously warm compared to the crisp cool autumn air we had left behind in Wisconsin. My daughter turned to me and said, "Dad, it smells just like your frog room here". I noted with some satisfaction that she was right. The next few days presented us with a constant barrage of new experiences. While the night air had been warm and damp and sweet, it was nothing but **HOT** in the day time. Between the hours of eleven in the morning and three in the afternoon it was foolish to try to do anything outdoors, but we were not used to taking four hours out of the middle of our day. Even though our hosts (North American missionaries) had been there long enough to become fully acclimated to Brazilian life, they knew we had only a few days before our next flight so they accommodated us and we went sight seeing in the heat of the day.

Manaus is a boom town, it is the port through which everything going "up-river" must pass. It is a big city, in some respects sophisticated, but in many ways quite primitive. Our friends told us that seeing the Port of Manaus was the starting point of an understanding the Amazon. We were there in November which is the dry season. At this time of the year the river is low and this makes the handling of freight very difficult. There were a great many freight handlers who, for a small fee, would carry anything up from the boats across an expanse of extremely slippery clay mud to the market. I saw one fellow laboring under the weight of an enormous pile of salted fish. These were huge slabs of meat, filets measuring at least two by five feet, and he had them slung across his shoulders. There were a few piers to which were moored a menagerie of rag-tag riverboats, most contracted to ferry supplies up the Amazon. The center of the market was occupied by a large building, open at both ends, overlooking the port - the meat market. What a sight, and what smells!! As soon as we entered the street-side door the smell assaulted us with a ferocity that must be experienced to be fully appreciated. Refrigeration has yet to be introduced. There were row upon row of butcher block tables. For the most part the meat was cut by hand with cleavers and knives, although there were a few band saws. Everything was filthy, absolutely filthy! The table surfaces were marred by the constant chopping of the cleavers; occasionally someone smoothed down the working surface with a large wood rasp. This mixture of wood chips, bone, blood, fat and chunks of meat all went on the floor where a hord of flies competed for it. At the end of the day this was shoveled

up and dumped into the river. We made it half way through the market before our distress became urgent. It was an equal distance to the door we came in through and the one overlooking the port. A hasty exit from the meat market was followed by a solemn vow to a strict vegetarian diet throughout the rest of the trip.

Manaus is a melting pot, Brazil is a melting pot. Portuguese, Spanish, African, Indian - all these influences could be seen reflected in the faces of the shoppers in the market. If racial tension existed, we did not discern it. Periodically we saw some poor soul whose body had been ravaged by leprosy begging at the curb. Manaus fulfilled my fantasy of what an American gold-rush town must have been like a hundred and fifty years ago.

Our stay in Manaus was short, just a few days while we waited for the next flight that would take us across most of the Amazon basin to Leticia, Colombia. From here we planned to journey back down-river by boat about one hundred and sixty miles to Santo Antonio.

We flew straight west, following the river, to Leticia, Colombia where there is an airport capable of handling large jets. From here we ferried a few miles down-river, back into Brazil, to our second stop - Benjamin Constant.

Benjamin Constant was a study in contrasts, at once primitive and at the same time boasting of some of the modern conveniences we were used to. There was a diesel electric power generating plant in the center of town and outside it there was a shallow ditch that carried raw sewage down to the river. Incidentally, the sewage flowed into the river a few hundred yards up-river from the main city water intake pumping station. We drank only bottled water and I never asked where that water came from or where it was bottled, I really did not care to know. A person has to drink something! We were advised that we should only drink beer but beer is a rather scarce commodity at most Baptist mission stations.

We stayed in Benjamin for about a week waiting for the boat that would take us down-river to Santo Antonio. This was the first place that I actually had a chance to go out into the jungle looking for frogs. I expected to find *D. quinquevittatus*, *D. pictus* and *D. trivittatus* - I was not disappointed. Our hosts arranged a guide for us. Pedro worked for Tom, the mission pilot, but it was obvious that he regarded a day in the jungle, serving as guide for the gringos, as a day off. We paid him well by the standards of the local economy. We

walked out of town on a dirt road, through a rather large area that was being burned off for expansion of the agricultural fields that surrounded the town. Although we had flown over many millions of acres of jungle, this was the first evidence of the great Amazon burn-off that we saw. We left early in the morning but already it was **HOT**, 90° F or better. We did not venture far enough from town to get into what might be termed "primary forest". It looked as though the original logging of the virgin forest had occurred many years before. We were in good solid secondary lowland forest, perhaps a mile or so in from the river. While walking along on the forest trail we came upon an area about the size of a football field that was brightly lit by sunshine. In the center of this stood the trunk of an enormous tree. I recalled seeing photos of the big redwoods in California, the ones that are big enough to carve a car tunnel through - this tree was that big! It went straight up without branches for about fifty feet with very little change in the circumference of the trunk. There it ended abruptly, apparently having there been struck by lightening. Where its canopy had been, the sky was brilliant blue and the sunlight poured in to encourage a dense undergrowth. There was no sign of any of the rest of the tree, nor was there any evidence of any similar trees having once been there. Had the whole forest once been made up of trees like this? Pedro said yes, they had been logged off many years before. There were no stumps to testify to the logging, decay occurs rapidly. The wood was soft and crumbly and it seemed that it would not stand much longer but I was glad that it had escaped the loggers and stood long enough to testify to me of the glory of the forest that once had been.

While standing there reflecting on these things I noticed an intense burning of the skin of the back of one of my arms, first one small spot then another, then another. Closer inspection revealed a minute red ant - FIREANTS! - and aptly named they were. The small size of these creatures was more than made up for by their persuasive power to hasten a retreat from any unfortunate soul stumbling into their domain, in this case us - and we left in a hurry. I should say I was in a hurry to get out of there, they did not seem to bother Pedro who told me with a laugh that the fire-ants always preferred gringos.

As we were walking along the path and I noticed a rather large frog as it jumped into a hole in a fallen log. As quick as it went in, Pedro's hand went in after it! At that I thought to myself, you're a better man than I am Gunga Din. I had been on the lookout for snakes and I sure did not want the first one to be

found while groping blindly in a hole with my hand. Pedro shrugged off my concerns by telling me that once he had been out with a friend of his and the fellow was bitten by the "two-step" snake, and sure enough he only made it two steps before falling dead! The frog turned out to be a rather bizarre looking leaf mimic of the genus *Hemiphractus*.

So, what of the *pictus*? They were everywhere; it was difficult to walk more than a few feet on the path without seeing one. I only saw adults. They were approximately two centimeters in length, the backs had a rather granular texture and were essentially black. Some specimens had a few tiny flecks of white on the black. There were two yellow dorsolateral stripes extending from the snout to the pelvis and a second stripe on each flank. They had a distinctive bright yellow flash spot on each thigh and a smaller one on each calf. These were seen only with the legs extended and, true to their name, flashed as the frog jumped. The dorsum of the legs was very rough and granular appearing, it was chocolate brown in color. The abdomen sported a black marbling on a light pastel blue background. I did not hear any calling at all. I collected a few specimens but did not plan to keep any because I knew that I would be unable to keep them alive for five weeks before I headed for home. I did keep a few, together with two specimens of *Dendrobates quinquevittatus* that I collected on the way back to town. I later regretted having done so in as much as all the specimens that I collected died from the heat on the walk back. I developed a case of heat prostration on this first expedition. I arrived back at Tom's house in the early afternoon with severe dehydration, leg cramps, edema of the hands and feet, and a general ill feeling that took me the rest of the day and night to get over.

I had brought some cash with me to Brazil for the specific purpose of hiring a flight into the area of southwest Brazil where I hoped to find *D. vanzolinii*. When I approached Tom with this idea he looked at me like I was out of my mind. He had been in the Amazon for twenty years and his job was rescuing people from the jungle, not delivering them up to it. He would have no part of it. So we spent the next few days waiting for the boat and enjoyed the good company of Tom, who it seemed had no end of fascinating stories from his long service as mission pilot. One story particularly sticks in my memory. He told of a time, a few years prior to our visit, when he was contacted by an agent of the Brazilian Indian Protection Agency. They had received word that

an Indian lady from one of the "primitive" tribes was very ill and near death. Tom's was the only pontoon plane in the area and they needed him to fly in to get her. In exchange for two barrels of aviation fuel he, the agent, and a Brazilian Doctor flew to a very remote area of jungle to rescue this lady. They located the village but were unable to find a suitable body of water to land on nearby. From the landing site they walked for eight hours to get to the village. What they found when they got there was a small group of stone age Indians - the real thing! They spent the night there and the next day prepared to depart. The Brazilian Doctor had struck up a friendship with one of the villagers and they learned that an exchange of gifts was customary among new friends. The Doctor wanted his new friend's blow-gun but the Indian wanted the Doctor's pants. It seems the Doctor wanted the blow-gun so badly that he willingly went home in his underwear, this mystified Tom but my response to it mystified him even more. I told him that I would have gladly traded all my clothes and gone home stark naked, even if I had to land that way in Miami, just to have the chance to recount such a great story back home. Blow-guns must have been so common to Tom that he could not see the attraction; all I can boast of having traded for the one that hangs in my frog room is a little money, not nearly so glamorous, but nevertheless it is a treasure to me! The conclusion of the story is that the lady died in the plane on the return flight and Tom got hepatitis, which laid him up for six weeks. Even Tom had to admit that a blow-gun was preferable to a dead Indian and a case of hepatitis.

Phase three; the trip down-river by boat. Tom had offered to fly us but I declined because of the expense and also the fact that I wanted to experience one of these Amazon riverboats. He wished us well, told us not to eat anything on the boat, and sent us off on the *Clivia*. Ah the *Clivia*, what fond memories! The boat was loaded with every conceivable commodity. There were row upon row of bunches of bananas. There were parrots in cages, bicycles, outboard motors, etc., etc. There was a small monkey tied up on a countertop in the kitchen at the back of the boat. As I watched this monkey, he stood up and urinated in the stew; we took Tom's advice and ate only what we had brought ourselves. We left Benjamin Constant at night and two hours out of port we were stopped by a Federal Police boat. When I saw them coming on board with machine guns I became a little nervous. They were looking for cocaine. Fifteen kilograms were found in the cargo hold. Apparently this boat was used regularly

for cocaine running. This was just the beginning of our Clivia adventure.

The people on the boat had no qualms about throwing all their garbage into the river. I guess it never occurred to them that this was polluting the river. Apparently the same mentality that saw no danger in burning off the jungle held faith in the endless capacity of the river to absorb all manner of human waste. I insisted that we put our garbage in a small waste bin that sat on the deck. I watched in disbelief as one of the stewards, who happened to be passing by, picked up the waste bin and dumped it over the side.

The next morning it struck - dysentery, not just ordinary diarrhea, but BIG TIME diarrhea. *"Sit on the pot until the top of your head caves in"* diarrhea. We were all sick. We had tied our hammocks close to the toilet, which as it turned out was very fortunate. The bathrooms were filthy. Lying in my hammock feeling sorry for myself, I rather suddenly perceived that an atomic detonator was about to explode inside my colon. I made a mad dash for the bathroom only to find it occupied. I banged on the door to communicate my urgency and a Brazilian lady hurriedly exited to let me in. She did not speak English but the look on my face must have let her know that I was in distress. I barely got the door shut and my pants partially down (no time to sit) when the explosion occurred. I could hear chuckling outside the door and I was humiliated, another gringo reduced to a butt-sputtering idiot by the mighty Amazon. I noted with some small sense of ironic satisfaction that I had at least left my mark on the Clivia - all over the back wall of the bathroom. I could not even pity the people who would have to use that bathroom after me, such was my indignation. As I lay in my hammock I glanced over at my wife and she said to me "this is your fault, you and your damn frogs". What could I say, when it came time to return to Benjamin we flew.

I had many chances to go out into the jungle during our stay at Santo Antonio. Everything was very dry and I found no frogs at all. Each time I went out I first took note of where the river was relative to the path of the sun. I reasoned that if I were to get lost I could always find the river and follow it back to town. Well one day I did get lost, it is surprising how frightening this can be. All the paths looked familiar and at the same time unfamiliar. Thinking to myself what a clever fellow I was, I headed for the river. It had never occurred to me that some natural obstacle might be between me and the river -and of course

this is exactly what happened. As I approached the river it got wetter and wetter until I found myself walking knee deep in a swamp. I might have been terribly anxious if it had not been for the fact that I had solved the mystery of where all the frogs were. They were in the swamp. There were literally thousands of *Dendrobates pictus*. I did not see any tadpoles but there were many tiny baby frogs and many adults. The swamp was alive with their incessant calling. I finally made it back to town and subsequently had many opportunities to revisit that swamp and collect a fairly large sample of adult frogs. It was close enough to the time when we would be returning to Wisconsin that I decided to make the collection that I would try to get home with. I collected about forty frogs.

I kept these frogs alive by feeding them ants. It must have seemed quite strange to the local people to see me, each day, dusting ants from the seemingly endless single file procession that marched along the top rail of the fence. I kept the frogs in a large styrofoam container with a screen top. After our return to Benjamin Constant I divided the frogs into two groups. We planned to fly up to Iquitos, Peru for a week and I did not know exactly which route we would be taking home so I thought that if we did not return to Benjamin, at least I would have half of them. Long before we had set out for South America I had diligently tried to obtain a permit to collect and export some frogs. This was a great frustration and I never did get the permit. It happened that there was a local branch office of the forestry management department in Benjamin. The fellow who ran the office had never heard of such a thing - exporting frogs - but he agreed to check into it for me and after I suggested that I would be willing to pay a fee (in cash of course) to expedite the process, he said that he would get right on it. The first challenge came when we prepared to leave for Peru. At the airport we had all our bags inspected by the Colombian Federal Police (the airport was in Leticia). I made no effort to conceal the frogs. I knew the Portuguese word for thank you, *Abrigado* - or something like that. Whatever they asked me (in Spanish) my reply was the same - *Abrigado* - *Abrigado*, with a big smile. Fortunately for me, no-one there spoke English. After a few minutes of this the guard, in frustration, closed up the box and waved me through. This trick worked just as well on the return trip from Iquitos. Once back in Leticia I learned that we had had some changes in our plans. We were taking a flight directly from Leticia to Belem, bypassing Manaus, and we would not be returning to Benjamin. I made some hurried arrangements to have the frogs

brought over to Leticia and after a very anxious wait they arrived just a few hours before our flight. At this time I learned that I would not get the permit! It seemed that the permit which I had arranged for was only good if we left the country via Colombia (Leticia). This made me nervous, I thought that I could probably get the frogs out of Brazil but I anticipated some trouble getting them into the U.S. without a valid collection permit. At the departure gate I sought out the same policeman whom I had frustrated the first time and as I approached him with my box of frogs he just smiled at me saying *Abrigado - Abrigado*, waving us on through customs, what luck! This had worked so well that I got a little bold about it in Belem. After a few smiles and *Abrigados* I asked "*Sprechen Sie Deutsche?*" I do not know what possessed me to do such a stupid thing - I don't even speak German myself! I guess I was tired from all the traveling and was feeling a little cocky from having gotten through customs so many times already. Lucky for me the policeman spoke only Portuguese, however, much to my dismay, the fellow behind me piped up with "Can I help? I speak German." I quickly explained that, as much as I appreciated his offer, it would not be much help since the guard spoke neither English nor German. Then I smiled at the guard, said *Abrigado*, and looked back over the long line of impatient travelers behind me. At this my new found friend stepped forward, put his hand on the box, smiled and said *Abrigado - Abrigado*. At this the guard shook his head and waved us on through. Only one more obstacle - Miami. By the time we got to Miami we were exhausted from the traveling and Gail had lost all enthusiasm for my frogs. Despite this she patiently waited the hour and a half that it took me to finagle my way through customs in Miami. This all happened before Dendrobates went on Appendix II of CITES. I had decided that I would make no effort to conceal these frogs in Miami. I had filled out a U.S. Fish and Wildlife declaration form and I held it in my hand as we went through. I had decided that if they did not ask me about it I would just keep my mouth shut and if they did, I would hand them the form as if that had been my intention all along. Of course they did ask. Upon showing the frogs, the customs people were at a loss as to what to do about it. I tried to take advantage of this by getting out my CITES catalog to show them that these critters were not on the list. After much debate among the Customs Officers they decided that this was actually a problem for the Agriculture Department, so they sent me off to wait in another line. The Agriculture Department Officers were not in the least bit interested

in the frogs but they were rather upset about the moss and leaf litter that they were packed in. They made me pick all the frogs out and then they confiscated all the other stuff. By this time my anxiety level was at an all-time high and Gail was becoming UNHAPPY. After this I was sent back to customs and had to listen to a half an hour long argument between the Customs Officers and the people from Agriculture about who had jurisdiction over these frogs - neither of them wanted to be bothered with it. Finally they decided that they would both be off the hook if they referred it to Fish and Wildlife. The problem with this was that the Fish and Wildlife Service did not have an office at the airport! Gail suggested that I might consider flushing the "damn frogs" down the toilet! The Customs Officer was getting tired of the whole thing so he decided to call the Fish and Wildlife people on the phone. No answer! By this time I had about had enough myself so I told the guy - O.K. keep them, seven weeks of field research will be down the drain but I have been traveling for a day and a half and I do not want to hassle with this anymore. Much to my surprise he said "OK - take them through, but next time you be sure to have the proper permit." My reply - *Abrigado!* Four days later the twenty-five survivors were in my terrariums in Madison.

➤ All went well for about a week - then they began to die! I was just sick about it. One-by-one eight of them died the first week, two the third week, three the sixth and so on. I noted that after death, worms could be seen coming from both the mouth and anus of the frogs so I thought that the problem must have been these worms. After getting some advice on what to treat the worms with I went to the local Veterinary School pharmacy and got a bottle of fenbendazole. The formulation called for the fenbendazole to be mixed up in 10% aqueous propylene glycol. When I got home with the stuff I noted that it looked very viscous, too viscous. The treatment calls for the instillation of 0.1 cc of the medication into the frog's stomach via a small silastic catheter. As I was treating the fourth frog I noted that the first one went into a spasm with all its limbs outstretched and twitching. All four of these died and of course I did not treat any more of them. I took the medication back to the pharmacy and learned that they had made a "slight mistake" and had mixed the fenbendazole up in 100% propylene glycol rather than 10% aqueous. I was a little upset - to say the least. I explained to them, in graphic detail, how I had endured the Clivia, and the Amazonian mud, and narrowly avoided the dreaded two-step snake,

and how I had sweated blood and bull-shitted my way through customs five times with these frogs. These few specimens were the only ones in the entire U.S.A. and their "slight mistake" would probable result in the loss of any chance to salvage the colony. They agreed to pay me \$75.00 each for the frogs, which was no consolation to me, but the truth was there was not really anything that could be done about it. Without further treatment the colony dwindled down to three specimens, two females and one male. Every day for a year I listened for the call of the male; Cheep-Cheep-Cheep ----- Cheep-Cheep-Cheep. I knew that when this one was gone, that would be the end.

A year or so after I got the *pictus* home I planned a collecting trip to Hawaii. I had arranged for a friend of mine to care for my collection while I was away. The night that he came over for some last minute instructions I noted that the calling of the little *pictus* male was different than I had been hearing. Usually he would call with three short bursts, Cheep-Cheep-Cheep. That night he was calling with a sustained succession; Cheep-Cheep-Cheep-Cheep-Cheep-Cheep and on and on for about forty five seconds. He would rest a few minutes and do this again. I suspected that this was the long anticipated breeding call. My friend asked what he should do if eggs were layed and, for want of a better idea, I told him just to leave the eggs alone and that the frogs would care for them. Upon my return I found a clutch of about twenty eggs - all dried up! What frustration! I thought that if this little male would just live long enough to do it again I might yet salvage this little colony. After about three and a half weeks there was another clutch of seventeen eggs. Most of these did not look good. They were irregularly shaped and some had a rather unhealthy grey-greenish color to them. Of these, five developed up to the point of hatching and then died in the eggs. Three weeks later another clutch of twelve eggs was layed. Of these seven developed up to the point of hatching. I was tempted to release them from the eggs because of what had happened to the last clutch but I was reluctant to do so. That night I decided to leave them one more night and the next morning three of them were dead in the eggs. I released the remaining four and to my great relief they began developing normally. These four tadpoles (as of this writing they are still tadpoles) all look healthy and I have every reason to believe that the will develop into little froglets. The juvenile frogs that I saw in Brazil were extremely tiny so I am breeding some very tiny spiders to feed them. What happens after

metamorphosis remains to be seen - I will cross that bridge when I get there.

The other day my brother, who is not a lover of Gifkickers, visited me and I was showing him my collection. I showed him the four small *pictus* tadpoles and told him that they were **really special** to me. He looked at them and remarked "they look like all the others (I have tadpoles of several other species at the moment). He quickly lost interest. If he only knew the whole story behind them!

Maybe the day will come when I will have a surplus of *Dendrobates pictus*. If that happens I will of course want to share them with other breeders and if you happen to be one of those who gets some you will know the story behind them - and what a really excellent adventure it was!

Travel Grant Fund Proposed

ISSD is creating a special travel fund to be used by members who will be presenting papers at the annual meetings. Last year, and again this year, our annual meeting will be held in conjunction with the International Herpetological Symposium (**IHS**). Details of the itinerary of the 13th **IHS** can be found elsewhere in this newsletter.

We are hoping that the association of the **IHS** with **ISSD** will be of benefit to both organizations. Therefore we are establishing this fund to encourage participation in the symposium by **ISSD** members who wish to present papers. It is felt that the financial burden of travel to the **IHS** might be discouraging some who might otherwise be able to make a significant contributions the **IHS**.

Perhaps you have been thinking that you would like to attend the **IHS** but are unable to do so because of the expense - you are not alone! Even though you may not be able to afford the entire cost of travel to the meeting yourself, you might consider making a financial contribution to help enable one of your colleagues to do so.

As Editor of the Newsletter, I am proud to make the first contribution to the fund - \$100.00. All members are encouraged to make contributions. Any amount will be appreciated greatly. Contributors are requested to follow the same guidelines concerning checks and money orders as have been detailed for dues payments. This money will be held in reserve for the express purpose of funding the travel grant program and will not become part of the **ISSD** general operating fund. The status of the fund will be reported to the members in the annual treasurer's report.

Contributions should be sent to:

ISSD - Travel Grant Fund
c/o Ed Tunstall
2320 West Palomino Drive
Chandler, Arizona U.S.A.
85224

Contributions will be acknowledged by a written receipt.

Those interested in applying for grants may contact Dale Bertram. Guidelines for grant applications will be sent to individual applicants upon request. In order to inform the membership-at-large and especially to inform prospective contributors, these guidelines are briefly summarized below:

Grants will be awarded to **ISSD** members in good standing only.

Grants will not exceed \$500.00 per person and may be used only for travel expenses to and from the meeting.

Grants will be awarded only to applicants whose papers have been accepted by the **IHS** for presentation and, similarly, approved by **ISSD**.

The paper must pertain to some aspect of the study of Dendrobatid frogs, but is not otherwise restricted.

Respectfully submitted: Dale Bertram, Newsletter Editor

Classified Ads:

FOR SALE: *Phyllobates vittatus* (0:0:8 available, CB); \$40.00 each for ISSD members, \$50.00 each for non-members. * *Epipedobates anthonyi* (0:0:16 available, CB); will sell to ISSD members only, \$50.00 each or three for \$45.00 each. * *Dendrobates auratus*, Panamanian form that has some blue (0:0:6 available, CB); \$40.00 each to ISSD members, \$45.00 each to non-members. * *Dendrobates histrionicus*, bullseye pattern, (24 wild caught adults available with CITES II papers); \$45.00 each to ISSD members, \$50.00 each to non-members. * *Dendrobates leucomelas* (CB); \$60 each to ISSD members, \$75.00 each to non-members. * *Dendrobates tinctorius*, blue & yellow (0:0:4, CB) 1/2 inch, \$75.00 each. * *Dendrobates auratus*, Costa Rican form, 3/4 inch CB, (0:0:15 available), \$45.00 each. * *Dendrobates auratus*, Hawaiian, CB/CR - 1 inch (0:0:13 available), \$35.00 each. * *Dendrobates histrionicus*, Peruvian form (1:1 available), \$80.00 - pair. *** Call: Andrew Briskin at (305) 270-0419.

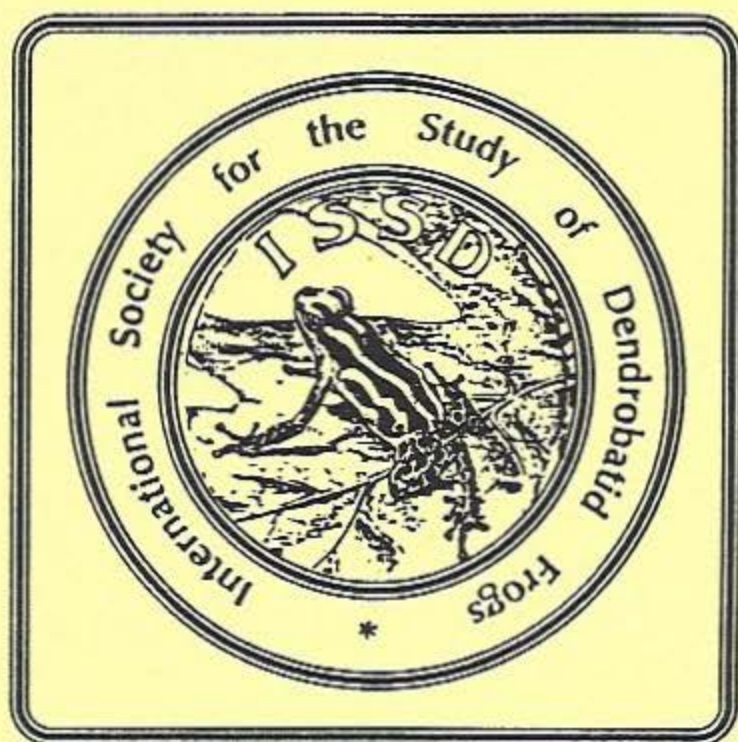
FOR SALE: A few CB Hawaiian *auratus* remain, \$15.00 each. * Waiting list now forming for CB *Dendrobates tinctorius*. Both the Cobalt-Blue and the Powder-Blue forms will be available this summer (\$35.00 each). Supply limited - deposit required. Write to: Dale Bertram at One Virginia Terrace, Madison, Wisconsin 53705. No calls please.

Beginning with the next Newsletter (Volume II, # 3) we will offer space for commercial advertising. The placement of ads does not in any way imply endorsement of the advertiser by **ISSD**. Also, **ISSD** reserves the right to edit the ads or to reject them at the discretion of the Newsletter Editor. The fee will be \$25.00 per quarter page. Interested persons and/or businesses may submit proofs of their proposed ads to the Newsletter Editor.

A Frog Love Triangle

- Heinrich Kley





ISSD invites anyone with an interest in the study of Dendrobatid Frogs to participate in its membership.

Membership Registration:

Name: _____

Address: _____

Phone #: _____

Date: _____

Comments: _____

Annual membership dues are as follows: \$20.00 for members living in the U.S.A. and Canada; \$25.00 for members living in Europe and South America. For members holding a personal checking account with a U.S. bank - a personal check (made out in U.S. dollars and made payable to ISSD) will suffice. For those who do not have an account with a U.S. bank - payment should be made using one of the following methods (listed in order of preference): 1.) A U.S. Postal Money Order made out in U.S. dollars. 2.) A Cashier's Check from a U.S. bank, or U.S. affiliate of a non-U.S. bank, made out in U.S. dollars. 3.) A Cashier's Check from a non-U.S. bank, made out in the normal currency of the bank of issue, for an amount which will yield \$28.00 when it is exchanged. 4.) Cash -U.S.\$, wrapped well so that it cannot be seen through the envelope, and sent via Registered Mail.

Send registration forms and dues to:

ISSD - c/o Ed Tunstall
2320 West Palomino Drive
Chandler, Arizona
85224 U.S.A.